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## The Knee



## Extension deficit after anterior cruciate ligament reconstruction: Is arthroscopic posterior release a safe and effective procedure?

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## ABSTRACT

**Background:** Postoperative extension deficits following anterior cruciate ligament (ACL) reconstruction can cause major limitation during daily life. The purpose of this study was to evaluate the efficiency of an all-arthroscopic approach and posterior capsule release for the treatment of persistent knee extension deficits following ACL reconstruction.

**Methods:** Between 2009 and 2013 a total of 10 patients with knee flexion contractures after ACL reconstruction were assessed following an all-arthroscopic approach and posterior capsulotomy. The clinical outcomes were reviewed using the range of motion (ROM), Tegner Activity Level, Lysholm score and visual analogue pain scale (VAS).

**Results:** Four women and six men with a median age of 34 years (range: 17 to 49 years) were included in the study. The median follow-up period was 25 months (range: 14 to 69 months). The median preoperative extension deficit was 15° (range: 10 to 20°) compared to the normal contralateral knee. Postoperatively at final follow-up the median extension deficit was one degree (range: 0 to five degrees) ( $P < 0.01$ ). The median preoperative Lysholm score improved from 52 (range: 32 to 67) to 92 (range: 84 to 100) postoperatively ( $P < 0.01$ ), while the median Tegner Activity Level improved from three (range: two to six) to six (range: three to seven) respectively ( $P < 0.02$ ). The median VAS status for pain decreased from five (range: one to 10) to one (range: 0 to three) ( $P < 0.01$ ). No complications were observed.

**Conclusions:** Arthroscopic posterior capsulotomy is a safe and effective additional procedure in the treatment of persistent knee extension deficits following ACL reconstruction with excellent results regarding ROM and subjective outcomes.

**Level of evidence:** Level IV.

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### 1. Introduction

Loss of knee motion following anterior cruciate ligament (ACL) reconstruction can cause severe disabling symptoms and may lead to the development of osteoarthritis [1–5]. In most cases an early functional rehabilitation protocol achieves satisfying results after ACL reconstruction, but still 0.49 to 11% of the patients need surgical arthrolysis due to limited range of motion (ROM)

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[6–12]. Cyclops lesions, ACL graft malposition or a fibrotic infrapatellar fat pad can cause persistent knee extension deficits by acting as an anterior extension block, which secondarily may lead to a contracture of the posterior capsule [1,13,14].

For the treatment of these longstanding flexion contractures some authors have introduced an open release of the posteromedial and/or posterolateral capsule in combination with an anterior debridement [6,13,14]. More recent studies proposed an all-arthroscopic approach with comparable results to the open procedure [15,16].

The purpose of this study was to evaluate the efficiency of an all-arthroscopic approach for the treatment of knee extension deficits following ACL reconstruction and to present the first subjective and objective results in a homogenous patient group. We hypothesize that an all-arthroscopic approach and complete release of the posterior capsule would improve knee motion and patient satisfaction in case of persistent extension deficits following ACL reconstruction.

## 2. Material and methods

### 2.1. Subjects

Between 2009 and 2013 a total of 10 patients were assessed following an arthroscopic posterior capsulotomy. Patients were scheduled for surgery if adequate physical therapy failed to improve a symptomatic extension deficit greater than five to 10° compared to the normal contralateral knee following ACL reconstruction. Before surgery standard radiographs and magnetic resonance imaging (MRI) were obtained to evaluate especially the ACL graft, bone tunnels, patellar height and the infrapatellar fat pad. During clinical examination the flexion contracture demonstrated a stiff endpoint, physical therapy showed no improvement after more than two weeks and any signs of infection were ruled out.

The surgical management was performed according to a standardized algorithm (Figure 1) and not before three months after the index procedure.

### 2.2. Surgical technique

The purpose of the arthroscopic posterior capsular release was to incise the complete meniscomfemoral portion of the posterior capsule (Figures 2b, 3) as first described by Pace and Wahl [17] in a cadaveric study. Before surgery, the patient's range of motion (ROM) was reevaluated under general anaesthesia. With the patient in the supine position the upper thigh was placed in a leg holder which allowed 90° of knee flexion.

Diagnostic arthroscopy was performed using standard anterior viewing portals (Figure 4). Any pathology in the anterior compartment (e.g. cyclops lesion, intercondylar impingement) was treated first (Figure 1). If the initial extension deficit did not improve following notchplasty or anterior debridement, the posteromedial compartment was visualized to initiate the arthroscopic posterior capsular release. A 30° arthroscope was directed through the intercondylar notch following the lateral wall of the medial femoral condyle inferior to the posterior cruciate ligament. If necessary an additional central, transpatellar portal was created (Figure 4) and a blunt obturator was placed first to get access to the posteromedial compartment [15]. The posteromedial portal was created under direct vision and with the knee in 90° flexion by placing a spinal needle in the soft spot between the medial collateral ligament, the medial head of the gastrocnemius muscle and the tendon of the semitendinosus (Figures 2a, 4) [17].

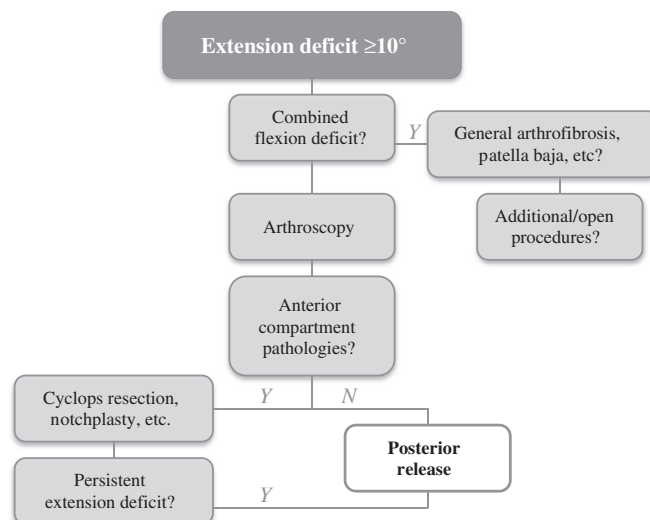


Figure 1. Therapy algorithm (Y: Yes, N: No).

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